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ABSTRACT

This issue, number 31 in the series, is divided into three sections: British science activities, Overseas science activities, and International science activities. The British activities section reviews current curriculum projects and educational research in British secondary level science and mathematics education. Included in the Overseas section are discussions of curriculum projects, educational conferences, and training programs in various countries including Australia, Papua New Guinea, the Carribean, and several African nations. The International activities section is devoted to news items concerning international congresses and associations for science and mathematics education. (MH)

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THE BRITISH COUNCIL

11/24/76

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

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Science Education Newsletter

Number 31 September 1976

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SEN NO 31

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BRITISH COUNCIL SCIENCE AND MATHEMATICS EDUCATION PERSONNEL

Many changes have taken place since January 1976, (SEN 29), when we issued the last list of science and mathematics personnel. A revised list is given below.

PERSONNEL IN LONDON

Schools and Further Education Department:

The Director is now Mr Dennis Chisman (formerly Head of Science and Mathematics Education Unit).

Science and Mathematics Education Unit:

Mr B T Chadwick:	Head SMEU (formerly ACTS officer Mauritius)
Mrs J Nightingale:	Assistant
Miss H Suffern:	Education Officer, Biological Sciences
Mr G P Thompson:	Education Officer, ACTS scheme (formerly ACTS officer Zambia)
Miss D Titheridge:	Information Officer
Mr B Wilson:	Education Officer, Mathematics
Miss B Mullane	Assistant

PERSONNEL IN OVERSEAS COUNTRIES

1. Science Education Specialists working for British Council Offices

INDIA	Science Education Officer, Delhi	Mrs U BAJPAI
	Science Education Officer, Bombay	M NAIK
	Science Education Officer, Madras	G M JOHN
INDONESIA	Science Education Officer, Djakarta	B YOUNG
KENYA	Science Education Officer, Nairobi	S MOSS
MALAYSIA	Science Education Officer, Kuala Lumpur	A D BATES
NIGERIA	Assistant Representative, (Science), based in Ibadan	D SLIMMING (formerly ACTS officer Swaziland)
	Assistant Director, (Science), Ibadan	J M S WHITTELL
	Assistant Director, (Science), Kaduna	M B ATKINSON
PAKISTAN	Assistant Representative	J L DOBSON

2. ACTS Officers

BARBADOS	Consultant, Caribbean Regional Science Project University of West Indies, Cave Hill	C M LANCASTER
BOTSWANA	Education Officer (Inspector) Maths Ministry of Education, Gaborone	M MACRAE
	Science Curriculum Development Officer Ministry of Education, Gaborone	D C SANDERS
THE GAMBIA	Science Education Adviser, Yundum College, Banjul	A JARVIS
JAMAICA	Consultant, Science Education Centre University of West Indies, Kingston	P OKERA
KENYA	Senior Curriculum Specialist (Maths) Institute of Education, Nairobi	R ALLPRESS
LESOTHO	Maths/Science Advisory Officer National Teacher Training College, Maseru	A HERRIOT
MALAWI	Senior Lecturer (Biology) University of Malawi, Zomba	Miss H M MEREDITH
MALTA	Adviser on Science Teaching Ministry of Education, Valetta	Dr C E FITCHES

MAURITIUS	Specialist in the teaching of Science Institute of Education, Reduit	P M H DAVIS (formerly ACTS Zambia)
NIGERIA	Senior Lecturer (Maths Education) University of Ibadan	Dr W M HAWTHORNE
	Lecturer in Education (General Science) University of Ife	P A WHITTLE
	Senior Lecturer (Primary Science Education) Ahmadu Bello University, Zaria	J REEVES
SIERRA LEONE	Curriculum Revision Officer (Secondary Science) University of Sierra Leone, Fourah Bay	B NICHOLL
SRI LANKA	Consultant in Science Education Ministry of Education, Colombo	J M BOWLES
	Adviser in Mathematics Ministry of Education, Colombo	M J BATTY
SWAZILAND	Head, Science Department William Pitcher Teachers Training College, Manzini	T MERCATI
	Head, Mathematics Department William Pitcher Teachers Training College, Manzini	E D BICKNELL (formerly ACTS Malaysia)

CORRECTION

Please note that Mr J E Reeves' post at Ahmadu Bello University, Zaria, is that of SENIOR Lecturer (Primary Science Education) and not Lecturer, as incorrectly stated in Science Education Newsletter No 29, page 2.

BIBLIOGRAPHIES FOR SCIENCE, MATHEMATICS AND TECHNICAL SUBJECTS AT PRIMARY AND SECONDARY LEVEL

The Chemistry basic book list was enclosed with SEN 30.

We regret that it has not proved possible to enclose the basic book lists for all other subjects in this issue. The remaining lists will be sent separately later.

ACTIVITIES IN BRITAIN

1. ASSOCIATION FOR SCIENCE EDUCATION, Annual Meeting, 3–6 January 1977

The Annual Meeting of the ASE will be held at the University of Leicester from Monday 3 – Thursday 6 January 1977.

The British Council is organising a half-day symposium on 'Science Fairs and Out of School Activities'. This will examine out of school science activities in Britain and internationally, and it is hoped that 3 overseas speakers will outline such activities in their own countries. As usual, there will also be a supporting exhibition of materials from many countries, and a reception for overseas visitors.

The subjects of the other symposia are:

Health and Safety at Work

Language Use – Science for All

Games and Simulations

Girls and Science Education

Project Work in Schools

Current Issues in European Secondary Science Courses

N and F Level Syllabuses

Less Academically Motivated Pupils

Industry and Schools

Science Within an Integrated Curriculum

Members will also have the opportunity to hear a variety of lectures on topics of current educational and scientific interest, and to see several exhibitions. Visitors' days will enable non-members of the Association to attend most of the major events of the meeting.

Further information and application forms are available from: R G Turner, ASE Headquarters, College Lane, Hatfield, Herts AL10 9AA.

2. PROGRESS IN LEARNING SCIENCE – a Schools Council Project

Following a period of intense activity by curriculum development projects in the late 60s and early 70s, there is a great variety of classroom materials available for teachers and pupils. The problems facing teachers are: what is 'best' for individuals? what are appropriate activities for children at varying points of development? how can we tell whether or not children are making the progress we hope for? These questions are especially pertinent in the 5–13 age range, when teachers can decide what to teach without the pressure of examination syllabuses.

The Progress in Learning Science project was set up in 1973, under the direction of Dr Wynne Harlen, to help teachers with such questions. Starting from a basic belief that a child learns most effectively when his experiences are matched to his development in the abilities, concepts and attitudes which they demand, the project sees two kinds of information as necessary before appropriate experiences can be provided:

(a) information about where children are in their development of various ideas, abilities, etc

(b) information about what sorts of experiences are of benefit to children at various points in development. This concept of 'matching' – providing children with experiences which are comprehensible in terms of their past learning and present ideas, but which also challenge these ideas and advance their learning – is a most important theme in the project's ideas.

To give help in identifying children's levels of development, (a), check-lists have been developed, focussing observation on relevant behaviours, and providing a framework for interpreting what is observed. Two check-lists, one for the earlier, and one for the later period of development have been compiled by groups of teachers in primary, middle and secondary schools.

The second kind of help, (b), consists of material for guiding the matching of activities to pupils. Working groups of teachers have made sure that the guidelines are firmly rooted in their experience of children, and have provided illustrative examples.

Check-lists and guides are supported by a different kind of help for teachers in the form of *in-service* study materials: a pitfall of a great deal of curriculum development has been to give too much attention to preparing materials, and too little to preparing teachers. Materials are designed to study the ideas about 'matching', the use of observation for diagnosing levels of development, etc.

The materials, to be published in 1977 (publisher as yet unknown) thus serve two purposes: as a basis for in-service study, and as a resource to support classroom work.

The publications will be:

Two books for teachers:

'Match and Mismatch' Part I — In-service study material

'Match and Mismatch' Part II — Guide to Diagnosis and Development (for classroom use)

Checklists are included in both parts.

One book for group leaders:

'Match and Mismatch' Guide to Group Study — comprises Part I above and notes for group leaders.

A set of audio-visual aids to support the In-Service Study Material: 6 video-tape sequences, 6 tape-slide sequences and 5 audio-tapes.

From the end of 1976 until the Project finishes in August 1977, work will concentrate on dissemination; this process is being studied by the Project evaluator, Mr John Elliott. Further information about the Project is available from:

Dr Wynne Harlen, School of Education, University of Reading, London Road, Reading RG1 5AQ

or The Schools Council, 160 Great Portland Street, London W1N 6LL.

3. 11 – 13 SCIENCE PROJECT – Inner London Education Authority

The project is aimed at children in the unstreamed first and second years of comprehensive schools.

In recent years, a vast range of materials has been produced for children in this age range: in particular, Science for the 70s, Science 5/13 and Nuffield Combined Science. However, although there is more than enough material for the formal teaching of the sciences in book form, there is very little that caters for the instruction of pupils of all ranges of ability.

The 11–13 project aims to fill this need. It is being produced in the form of work cards, slide-tape sequences, flip booklets and games. The work cards include cut-out information, assessment and revision cards, and have a three-star rating system enabling the teacher to choose a card appropriate to the individual child's ability.

The project team are writing the following units:

Measurement

Environment

Sound

Mini beasts

Materials

Water

Air and Heating

Electricity and Magnetism

Light and Colour

Growth and Development

Sorting things out

Each unit will have a technical guide, giving help with the organization of the lessons, provision of apparatus and the order of presentation of the work cards. Suggestions are given regarding visits, further work, resources (books, charts, games, films etc) and demonstrations to supplement the work cards.

Further information will be available, as the project develops, from:

D P Marshall, Director, 11–13 Science Project, North London Science Centre, 62-66 Highbury Grove, London N5.

4. ADVANCED PHYSICS PROJECT FOR INDEPENDENT LEARNING (APPIL) – Inner London Education Authority

This project, based at the South London Science Centre, has been set up to provide support to schools where the numbers of students taking 'A' level physics is so small as to jeopardize the viability of classes in that school, bearing in mind the demand this makes on the timetable of highly trained (and sometimes scarce) physics teachers. The project team is writing and evaluating a two year course covering the London 'A' level syllabus (with extensions for most other Boards), which will require a large element of independent learning by the student. Such an approach has the advantage of preparing students for the learning methods commonly used in tertiary education.

The course has been designed with three basic ideas in mind:

a. The content should be 'concept' centred. Thus each unit of work is built around such fundamental concepts as 'waves', 'forces' and 'fields'.

b. Since concepts are developed rather than directly taught, the course should return to these basic ideas, and extend them, in the second year.

c. To allow for flexibility, units should be independent of each other where possible.

This has resulted in the following structure:

i. A two-level course: Foundation, for the first year, and Second level, for the second.

ii. Three themes, presented in the first year and extended in the second: 'waves', 'materials' and 'forces and fields'.

Materials Produced

Each unit is to consist of a *student text*, with these additional materials where appropriate: overhead projector transparencies, slides, audio tapes, 8mm film loops and detailed experiment sheets.

For the whole course there will be an additional *mathematical unit* and a *teachers guide*.

The project also recommends certain other resource materials such as text books and audio-visual aids.

Trials of the six first-year units are taking place in London schools. The four units of the second-level course will be completed in 1977.

Further details are available from:

A Covell, Advisory Teacher, APPIL, South London Science Centre, Wilson Road, London SE5 8PD.

5. A REVISED GUIDE TO MATHEMATICS PROJECTS IN BRITISH SECONDARY SCHOOLS – The Mathematical Association; Bell, 1956. ISBN 0 7135 1972 X, 80p

This is a revised version of the guide originally produced in 1968. It gives full details of all the major mathematics projects at Middle School and Secondary levels in Britain. A brief introduction to each project is followed by the names and addresses of those primarily responsible for its development, a list of its published materials, and an indication of its plans for the future. It is an essential work of reference for all those who wish to keep up to date with what is happening in secondary mathematics in Britain.

The guide has been compiled by Mr R L Lindsay of the Shell Centre for Mathematical Education, The University, Nottingham, NG7 2RD. It is obtainable from The Mathematical Association, 259 London Road, Leicester LE2 3BE.

6. CONTINUING MATHEMATICS PROJECT (See SEN 20.14, 24.7, 30.11)

The following units will be published by Longman towards the end of 1976:

Descriptive Statistics 1, 2, 3, 4.
Probability 1, 2, 3.
Statistics: Hypothesis Testing 1, 2, 3.
Parametric Statistics 1.
Linear Programming.
Indices and Standard Form.
Statistics. The Chi-square Test.

Each unit will cost approximately 35p.

7. THE SCHOOLS COUNCIL 6TH FORM MATHEMATICS PROJECT (SEN 15:8, 17:7, 21:17, 24:9)

The Project was established at the School of Education, University of Reading, in 1969, and it ends this year (1976). Its original terms of reference were to conduct a study of the situation in British Sixth Form mathematics teaching. One of its early conclusions was that a greater degree of 'relevance' was needed in material used in college and sixth form courses.

In carrying out its programme to meet this need, the Project has produced a series of texts based on trials conducted in over 100 Colleges and Schools. It has also published research studies and papers covering various aspects of the problem of mathematical education at the post 16+ stage.

There are two introductory booklets, followed by the Mathematics Applicable Series of 8 topic booklets. These, when taken together, provide a general post 16+ course of mathematics suitable for non-specialist students in Colleges and Sixth Forms. The booklets are self contained and may be used individually as introductions to the mathematical topics with which they deal.

Students' Discussion Unit: Mathematics Changes Gear

Teachers' Introductory Book: Presenting Mathematics from the Applicable Point of View

Topic Booklets:
- Understanding Indices
- Geometry from Coordinates
- Introductory Probability
- Polynomial Models
- Vector Models
- Algebra with Applications
- Logarithmic/Exponential
- Calculus Applicable

All the books are published by Heinemann Educational Books. Teachers' editions for all the students' units are in preparation.

The books are unorthodox in both content and format. The general approach is that mathematics provides us with a kit of models, which are most interestingly employed when they are used to explore the predictable consequences of proposed situations or possibilities. This emphasis on mathematical modelling permeates all the work of the Project. The format of the books is conducive to self-study by the student, and the emphasis throughout is on the usefulness of mathematics.

8. SCIENCE AND MATHEMATICS CENTRE, Birmingham

This Centre is one of many in Britain offering services to teachers within a local education authority. The Science and Mathematics Centre in Birmingham which serves the schools in the Birmingham area organises courses, meetings and exhibitions and provides accommodation for working parties and organisations. It also acts as a centre which disseminates information and provides advice on science and mathematics education.

Among the courses offered are: primary and secondary mathematics, nursery, primary and secondary science, calculators, geology, surveying, audio-visual aids, mathematics for biologists and geographers, food science, fibres and fabrics, electronics, microbiology, photography, and the use of the environment for science.

Among the projects based at the Centre are: Schools Council Science for the Less Able Pupil (see SEN 29:10) and Computers in the Curriculum. The latter project involves one part-time member of the Schools Council project based at the Birmingham Centre.

The Director of the Centre is Mrs Tessa Carrick. Visitors are very welcome.

9. UNIVERSITY OF STIRLING DEPARTMENT OF EDUCATION – Attitude Goals in Secondary School Science

This study, by Dr Sally Brown of the University of Stirling Department of Education, is the first in a series of educational monographs to be produced by the Department.

One of the crucial areas of concern during the upsurge of curriculum innovation in the 60s and early 70s has been that relating to the **objectives** of science courses; in particular, there has been a new emphasis on the achievement of **attitude** objectives. There has been little systematic opposition to this, since few would adopt a view that pupils should **not** achieve favourable attitudes to science. Much literature exhorting teachers to teach towards attitude

goals has been unsupported by adequate theory or empirical evidence. This monograph is an attempt to sift out some of the substantial information that is available and use it in examining, as a case study, the objectives of the Scottish Integrated Science Course (Scottish Education Department, 1969, Curriculum Paper 7).

Among the general objectives of the course was the achievement of certain attitudes. It was intended that pupils should acquire:

1. awareness of the inter-relationship of the different disciplines of science;
2. awareness of the relationship of science to other aspects of the school curriculum;
3. awareness of the contribution of science to the social and economic life of the community;
4. interest and enjoyment in science;
5. an objectivity in observation and in assessing observations.

Firstly, Dr Brown examines four kinds of justification for teaching towards attitude goals.

In Chapter 2 she has collected together some of the information we have about attitudes, from psychological theory and experiments, and to see how this information might help us towards the most effective ways to specify attitude objectives.

Chapter 3 looks at the different methods of assessing whether such objectives are achieved.

Chapter 4 describes an empirical study by Dr Brown of 14 year old pupils in Scotland. It considers changes in attitudes over a two year period, and explores variations in attitude achievement among schools, within schools and within teaching groups. This analysis enables the influence on attitudes of a number of variables to be examined. The results of the survey showed that, over the two-year period, scores for attitudes 1, 2, 3 and 5 listed above increased, while that for attitude 4 decreased. It is suggested that where feelings about science are concerned (as in 4), the subject has not lived up to the expectations pupils had on entry to secondary school. On the other hand, the scales related to cognitive learning indicate some attitude improvement. The study also indicates that some factors such as the schools's size, or its position in an inner-city area, which are popularly assumed to be influential, in fact exert very little influence on pupils' attitudes to science.

The University of Stirling Department of Education plans to produce two or three such monographs each year, meeting a need for reports of interest to teachers and other educationists. Most of the contributors will be members of the Education Department to begin with, but later it is hoped that educationists elsewhere will wish to contribute. Future issues will include reports on science education, examination policies and the teaching of history, and the costs and uses of microteaching in programmes of teacher education.

Copies of the 75-page report are available, price £1.00, from Department of Education, The University, Stirling, Scotland.

10. COMPUTER EDUCATION IN SCHOOLS (9:16)

From being the preserve of a few isolated enthusiasts in the late 1960s, some form of education about computers is now commonplace in British secondary schools. This change has come about through the work of a few major developmental centres, among them being International Computers Limited (ICL), the leading British computer manufacturer. ICL has taken a keen interest in computer education at school level for a number of years, and the ICL–CES Project has developed a widely-used set of materials 'Computer Studies'.

The overall aim of the ICL–CES Project is to facilitate the introduction of computer studies into the curriculum of schools and colleges, and to assist Local Education Authorities in carrying this out.

The main Computer Studies course consists of:

Pupils Book 1
Teachers Guide Book 1
Pupils Book 2
Teachers Guide Book 2
Pupils Book 3
Teachers Guide Book 3 (to be published about February 1977)

In addition, there is a 2-volume Teacher Training Manual for use on the many locally-run teachers' introductory courses. These courses are normally run by Local Education Authorities, with direct assistance from ICL–CES when requested.

The Computer Studies course uses an initial teaching language, CESIL (Computer Education in Schools Instructional Language. CESIL is later replaced by BASIC, which is widely viewed as perhaps the most suitable higher-level language for use in computer education. The emphasis, however, is not just on programming. Other aspects covered by the material include the nature of the computer, typical hardware, elementary logic and computer functions, computer languages and their use in commercial and scientific fields, social implications, and the history and likely future developments of computing.

The material is structured to provide a core of carefully related materials to be tailored by the teacher to individual school or college requirements. For example, they are suitable (1) for a CSE or GCE 'O' level syllabus, (2) to support the computer option in business and accounting courses, (3) for introductory courses for apprentices or clerical officers, (4) for leisure study at Further Education establishments. No previous computing or business knowledge is assumed beyond that of basic arithmetic.

Computer Studies Book 3 develops the course to GCE 'O' level or top CSE level, though it is not geared to any particular examination.

The trend away from regarding computers just as fantastic arithmetic machines is reflected by the development by ICL–CES of a complementary course, Information Retrieval in Schools (IRIS). There is a pupils book and a teachers guide. In this course, the divorce of computing from mathematics is complete. Here the emphasis is on information processing and retrieval, thus reflecting perhaps three-quarters of the total use of computers.

The material exploits computer software already used by non-computer management in government, commerce and industry. The teacher and his class follow worked examples until they can develop their own files of data, prepare enquiries for the data and specify the nature and format of reports to be produced by the computer. This realistic data processing application of computers introduces the use of the computer in other curriculum subjects with the minimum of technical narrative. It is a course well suited for use within, for example, the history or geography departments of a school, and could enable students to undertake genuine investigations within these disciplines that would be quite impractlcable without computer power.

Further information on all CES materials and services may be obtained from Computer Education in Schools, 322 Euston Road, London NW1 3BD.

11. PUBLICATIONS

11.1 Oxford Comprehensive Mathematics

Book 1.	Pp 160.	£1.50	SBN 19 914201 7.	Teacher's book £4.95	SBN 19 914217 3.
Book 2.	Pp 160.	£1.50	SBN 19 914202 5.	Teacher's book £4.95	SBN 19 914218 1.
Book 3 CSE.	Pp 176.	£1.65	SBN 19 914206 8.	Teacher's book £3.50	SBN 19 914222 X
Book 3 GCE.	Pp 168.	£1.65	SBN 19 914302 3.	Teacher's book £3.50	SBN 19 914219 X.
Book 4 CSE.	Pp 160.	£1.75	SBN 19 914207 6.	Teacher's book £3.50	SBN 19 914223 8.
Book 4 GCE.	Pp 160.	£1.65	SBN 19 914204 1.	Teacher's book £3.50	SBN 19 914220 3.
Book 5 CSE.	Pupil's and teacher's books)				
Book 5 GCE.	Pupil's and teacher's books)		to be published in 1977.		
Workbooks 1 and 2	25p each	SBN 19 914209 2/914210 6/914214 9 914215 7.			

1975 (Oxford University Press) **Workbooks 3 and 4** 20p each.

This series of books provides a course leading to either CSE or GCE 'O' level. They have been produced as a result of the spread of mixed-ability teaching in British comprehensive schools, and they are already finding a considerable use in schools which have adopted this strategy of teaching mathematics, at least in the earlier years.

The first two books are designed for use with all abilities. Exercises are graded into three levels, the first to be attempted by all children, the second by the majority, while the third is designed to extend the more able. Each book is accompanied by an expendable work book which, although adding slightly to costs, saves an immense amount of both teachers' and pupils' time.

The teachers' books consist of sets of teachers' notes, answers and further examples. The format is that of a ring folder, which gives flexibility while adding to the cost.

For years 3, 4 and 5 there are alternative books. Those with green covers lead to CSE level, while the blue-covered books are designed for GCE 'O' level candidates. The two courses are roughly parallel in content, though at different levels. Both courses are designed to cover the subject matter of most modern syllabuses.

11.2 Modern Mathematics for Schools: Scottish Mathematics Group: Second Edition

(see SEN 27:14)

Pupils' books 6, 7.	£1.90, £1.95.	SBN 0 550 75917 4/75918 2
Teacher's books 6, 7.	£2.25 each	SBN 0 550 75927 1/75928 X
Progress papers 6, 7.	50p each	SBN 0 550 75946 8/75947 6
Pupils' books 8, 9.	£2, £2.50.	SBN 0 550 75919 0/75920 4
Teacher's books 8, 9.	£2.50, £2.95.	SBN 0 550 75929 8/75930 1.
Progress papers 8, 9.	80p, £1.10.	SBN 0 550 75948 4/75949 2.

1974/5 (Blackie/Chambers)
(Standard book numbers given refer to Chambers publication)

These four revised books, together with the accompanying teachers' guides and progress papers, complete the revision of the course developed by the Scottish Mathematics Group. The Scottish 'O' level standard is attained at the end of book 7, while books 8 and 9 cover the syllabus of the Scottish Higher Grade, one year later. In terms of English examinations they are roughly Additional Mathematics standard. They do not, however, contain any mechanics or statistics.

The progress papers consist of multiple choice questions intended for testing the work of the main books topic by topic.

11.3 Advanced Mathematics. Books 1 and 2, and book T. Longmans

Book 1, by L K Turner.	Pp xiv, 319.	£1.75.	1973.	
Book T,	Pp vii, 64.	75p.	1975.	
Book 2, by L K Turner, F J Budden & D Knighton.	Pp xiv, 561.	£3.95.	1975.	SBN 0 582 31799 1/35241 X/35240 1.

This is a series of two books and an extended pamphlet which covers the GCE 'A' level course in mathematics as a single subject. Although there are some minor topics which appear in some modern advanced level courses which are not adequately covered by them, the amount of supplementation necessary would be small. Mechanics and statistics are both adequately dealt with.

Book 1 covers roughly the first year of a 2-year 'A' level course, and book 2 the second year. The smaller book T deals with vectors and mechanics, and consists of a single chapter. This format is adopted so that it can be included either in the first- or the second-year course. Within books 1 and 2 most of the chapters are self contained and there is considerable flexibility in the order in which they can be taught.

11.4 Examinations: Their Use in Curriculum Evaluation and Development – J C Mathews & J R Leece

Schools Council Examinations Bulletin 33

This examinations bulletin reports on the findings of an investigation into the feasibility of using examinations as part of a curriculum monitoring and development process. The project, which was set up at the University of Lancaster, was financed by the Schools Council and the Nuffield Foundation, with facilities for data abstraction being provided by the University of London, University Entrance and School Examinations Council. The Nuffield 'A'-level chemistry course and examination was used as a case study for the research.

The conditions of curriculum and examination design which are necessary for a system of continuous monitoring are described. These include a related structure of subject-matter, objectives, and teaching/learning activities common to the examination and the curriculum. The problems of collecting and processing data from examination scripts, record cards, and questionnaires are discussed. The report also includes suggestions for making data collecting and processing as quick and as inexpensive as possible.

The method described in the report is that appropriate to Nuffield 'A'-level chemistry, but it is possible that all the principles and some of the processes could be applied to other subjects. This bulletin should be of interest to all those concerned in the development of examinations and the curriculum.

The bulletin is published by Evans/Methuen Educational, price £1. Orders (including standing orders) should be placed with usual suppliers or bookshops. In case of difficulty contact the Sales Department, Evans/Methuen Educational, North Way, Andover, Hants SP10 5BE.

11.5 Technical Assistance and Innovation in Science Education – John Wiley & Sons

This publication prepared by Dr Robert Maybury, now UNESCO Field Science Office, Nairobi, Kenya reviews five programmes for improving science teaching at school level in Argentina, Brazil, Lebanon, the Phillipines and Turkey.

The review of these programmes was commissioned by the Ford Foundation as an attempt to assess the involvement of the Ford Foundation in more than 10 years of international assistance to education in developing countries. The five programmes reviewed have each received considerable grants of assistance from the Ford Foundation.

The first part of the book contains the five case histories as a descriptive account of the development of the programmes over the last 10 years or more. The second part of the study attempts to compare, analyse and interpret the experience of these programmes as methods of innovation in science education and as an evaluation of the effectiveness of technical assistance.

Although this review is restricted to five specific programmes financed very largely through Ford Foundation, the professional assessment of these programmes is of interest to the wide range of science educators throughout the world, and the evaluation of the effectiveness of technical assistance in these particular programmes is of interest to other aid agencies concerned with innovations in science education.

11.6 Living Together.

What are things made of? – published by RECSAM

These two slim booklets are integrated junior science materials produced by the Regional Educational Centre for South Asia and Malaysia (RECSAM). They were produced at workshop-seminars in 1975 by participants from Indonesia, Laos, Malaysia, Phillipines and Thailand with assistance from consultants specially attending the workshop and who came from the UK (supported by the British Council), New Zealand and Australia. Other units were produced in 1973 and 1974 and the two volumes under review are aimed at the first year of a 3 year course. There are teachers' guides to accompany the books but these are not reviewed here.

Both books are very strongly oriented towards encouraging experiments; they are clearly set out with good diagrams, and they include photographs of a surprisingly high quality considering the cheap format of the books. A vein of humour runs through the text and diagrams but it is sufficiently restrained to be an advantage. The book titled 'Living Together' is about food and energy cycles, ecology, pollution and the environment. It is somewhat tendentious in quality, although most people would support its environmentalist bias, especially this reviewer. The text *'What are Things Made Of?'* is about states of matter, crystals, solutions, atoms and cells. Both books are worth being looked at by those working in junior integrated science overseas.

11.7 **Light and Life** – A McB Collieu, £1.20, Wheaton

What is Energy – A W Wilson, £1.10, Wheaton

These two books are background reading suitable for post 'O' level students. For this purpose they are admirable and the book *'Light and Life'* is a first class and lucid exposition of spectra, lasers and photography. Their main value overseas would be for use by a teacher with a moderate knowledge of physics to improve his background to help, for example, in integrated science teaching. They would also be useful reading for arts students with 'O' level physics behind them, pursuing a general studies course. The books are not designed, however, for the overseas situation.

11.8 **Advanced Physical Chemistry** – A Holderness, published by Heinemann, £2.50

Inorganic and Physical Chemistry by Holderness is a well known traditional 'A' level chemistry text. The volume under review is a revision of the physical chemistry section of the famous textbook; an *'Advanced Inorganic Chemistry'* is expected later. The books by Holderness and Lambert owed their success to their extremely clear presentation and to the fact that they easily enabled teachers and pupils to find the answers to any conceivable chemistry question on the traditional syllabuses. Furthermore, the chemistry, although it was 'exam chemistry', was soundly based. This new edition conforms to the same criteria. It makes no concessions to Nuffield Chemistry, but it can be recommended to anyone who wants the best possible traditional 'A' level chemistry textbook.

11.9 **Schools Council Research Studies** – published by Macmillan Education

This series reflects the wide range of Schools Council research. All the work is related to problems of curriculum development, and has a practical relevance for the teacher. Subjects include fact-finding inquiries, surveys of teacher opinion, case studies of innovation in particular schools, analyses of concepts involved in effective teaching and curriculum improvements, and evaluation of the work of Council projects.

The most recent study, which falls into the last of these categories is:

Curriculum Evaluation Today: Trends and Implications – edited by David Tawney

A group of evaluators of Schools Council project produced, in 1969 and 1970, a study entitled *'Evaluation in Curriculum and Development: Twelve Case Studies'*. Since then, many changes have taken place in evaluation theory and practice.

Visitors to the Schools Council, many of them from overseas, have asked that these changes, described to them orally, might be published: this is the result. It is hoped that teachers, administrators and others interested in evaluation will find the work useful.

The study starts by defining curriculum evaluation; it then shows how evaluation provides information for making educational decisions. Later chapters examine change and development in evaluation strategy, techniques of evaluation, 'evaluation as illumination', recent evaluation studies of curriculum projects, and evaluation and the control of education. Examples are drawn from msot of the principal curriculum developments projects in Britain.

The study is published by Macmillan Education, price £3.25.

Other research studies which might be of particular interest to Science Education Newsletter readers are:

Pattern and Variation in Curriculum Development projects, 1973, 95p.

Mass Media and the secondary schools, 1973, £3.50.

Evaluation in Curriculum Development: twelve case studies, 1973, £2.25.

Nuffield Secondary Science: an evaluation, 1974, £2.95.

A science teaching observation schedule, 1975, £1.65.

Science 5 to 13: a formative evaluation, 1975, £4.

The development of writing abilities (11–18), 1975, £6.50. (see SEN 31).

To be published shortly:

Processes and products of science teaching.

Further details are available from the publishers, Macmillan Education, Houndmills, Basingstoke, Hampshire RG21 2XS.

OVERSEAS ACTIVITIES

12. AUSTRALIA

For several years, a number of Australian Science Educators have been working on a project for teacher education, the Australian Science Teacher Education Project (ASTEP). The project, which is a direct descendant of the British Science Teacher Education Project (STEP), has been co-ordinated by Professor P J Fensham of Monash University, Victoria, and Mr Denis R Driscoll of Canberra College of Advanced Education.

The result of this work has been some 47 units of teacher education material, grouped under these headings:

Understanding Science

Understanding Pupils

Models of Teaching

Considering the Curriculum

The Laboratory as a Teaching Resource

The Australian Context

These units are now being published, *in limited numbers,* in a 280 page volume entitled: *ASTEP – A Project in Teacher Education.* This edition includes, apart from the units themselves, an examination of the possible contributions of ASTEP to primary science, and two appendices on the resources developed with the units, and the evaluation of the project.

Orders for the volume should be accompanied by a cheque for £4 sterling (or 8 US dollars) payable to Monash University, and addressed to:

Mr J Northfield

General Editor, ASTEP

Faculty of Education

Monash University

Clayton

Victoria 3168

Australia.

13. BOTSWANA, LESOTHO AND SWAZILAND

Mathematics Workcard Project (SEN 29:17)

A report of this significant project has already been given in SEN 29. A report on the first two years of trials of individualised learning of mathematics by workcards at junior secondary school level in the three countries has been produced by the Faculty of Education of the former University of Botswana, Lesotho and Swaziland, under the auspices of UNESCO Project RAF 109. This Project has now come to an end. Enquiries about the availability of the report, which is dated March 1976, may be made to the Division of Pre-University Science and Technology Education, UNESCO, Place de Fontenoy, 75 Paris 7E.

14. CARIBBEAN

(a) **The Caribbean Mathematics Project** (see SEN 28:15)

This major curriculum development project was evaluated by Dr H Martyn Cundy in late 1975/early 1976. The report of this evaluation, entitled *'Caribbean Mathematics Project: An Evaluation Study',* is a substantial document, recording the results of one of the most comprehensive evaluations to be undertaken of a curriculum development project in a developing region of the world. The report is available from the Science & Mathematics Education Unit of the British Council.

(b) **Caribbean Science Readers**

This series of Readers, edited by Philip Adey, is designed for the early years of secondary schools, and will cover subjects of relevance to the life and economy of the Caribbean. The books relate these important aspects of life in the area with new science curricula being introduced into the schools (see SEN 29:18 and 30:15).

Sugar from Cane – P S Adey

This describes the various stages in the extraction of sugar, and provides many relevant examples of an interesting range of basic techniques.

There are two other titles in preparation:

Looking at Plants – J Thompson

Energy – M Turvey

The cost of each Reader will be approximately 50p.

15. LESOTHO

National Teacher Training College

The National Teacher Training College, Lesotho, is now in its second year of operation. It trains both primary and junior secondary school teachers. The 3 year course is an in-out-in pattern, with the whole of the second year being spent in practice teaching. The College is rapidly building up both in numbers and in accommodation; the first year intake was 78 students, the second year intake 300, of whom 100 are specialising in a variety of subjects at the junior-secondary level.

The work of the College is based on 3 styles of teaching: the short large-scale lecture, small group seminars, and the use of self-instructional material. In the Department of Mathematics, all this material is being developed by the members of staff of the Department itself.

Further information is available from the Head of the Mathematics Department, National Teacher Training College, Maseru, Lesotho.

16. NIGERIA

Teaching Aids Exhibitions, British Council

A series of seven exhibitions on teaching aids is being held at the British Council in Lagos from February to October 1976. The exhibitions are entitled: *General Teaching Aids Exhibition, The Teaching of Science and Mathematics in the Primary School, Language Development in the Primary School, The Teaching of Secondary Mathematics and Science, The Teaching of English in the Secondary School, Teaching Machines and Machines for the Production of Teaching Aids,* and *Teaching Aids for the Teaching of Art, Craft and Vocational Subjects.*

The aim of the exhibitions is to show a cross-section of aids, including book materials available for the teaching of science, mathematics and English at primary and secondary levels. School plans, furniture and some office equipment necessary for the efficient running of schools is also being exhibited.

The exhibition on the teaching of science and mathematics at primary level includes books, a selection of aids for the teaching of basic concepts in mathematics and simple science equipment and science kits.

A total of 21 British firms, 12 local firms and 8 local publishers supplied materials for the exhibitions.

The *Primary Mathematics and Science Exhibition* is also being shown in Ibadan, Kaduna, Kano and Enugu.

17. PAPUA NEW GUINEA

The Mathematics Learning Project, University of Technology, Lae

The University of Technology in Papua New Guinea offers Degree and Diploma courses in Accountancy, Architecture, Chemical Technology, Engineering (Civil, Electrical and Mechanical), and Surveying. Mathematics is a vital service subject to all these disciplines. In this young Commonwealth country (Independence 1975), however, most students come from rural backgrounds where the traditional culture makes few demands on the development of a numerical sense or of other mathematical concepts. Some mother-tongues, for example, count 'one, two, many', while there are only three distances, 'longway', 'longway lik lik', or 'longway tru'. Students entering the Preliminary year of the University often find particular difficulty with mathematics.

In 1971, Professor A C Bajpai of Loughborough University visited Papua New Guinea under the auspices of the Nuffield Foundation and of the Centre for Educational Development Overseas (CEDO). Based on his report, the University of Technology set up a Mathematics Learning Project to undertake research into students' learning difficulties and to produce materials to help to alleviate them. The MLP has been largely supported by funds from the Nuffield Foundation and from the Ross Trust, Victoria, Australia. A self-paced system of individualised learning has been developed for the first two years of the University course. There are now plans to establish this work on a permanent basis in the form of a Mathematics Education Centre. This Centre would serve the needs of all tertiary level institutions in Papua New Guinea, while based at the University of Technology.

Further information, and samples of materials, can be obtained from:

The Director
Mathematics Learning Project
University of Technology
PO Box 793
Lae
Papua New Guinea.

18. AUDIO VISUAL MATERIAL FROM OVERSEAS CURRICULUM DEVELOPMENT PROJECTS

The prices of the filmstrips with accompanying tapes, described in SEN 30:14:2 are:

Caribbean Mathematics Project Series (i), (ii) and (iv) £4 each.

Caribbean Mathematics Project Series (iii) £3.

Botswana, Lesotho and Swaziland Series (i) – (i..) £3 each.

Papua New Guinea

A filmstrip with tape-recorded commentary has been devised and produced by the British Council, describing the Mathematics Learning Project at the University of Technology in Papua New Guinea (for further details of this project see section 17 of this issue). It is hoped that it will be of interest to those concerned with mathematics education in many parts of the world.

The price of each filmstrip with tape is £3.

INTERNATIONAL ACTIVITIES

19. 1. FIRST PAN-AFRICAN CONGRESS OF MATHEMATICIANS

This Congress was held at the Faculty of Science, Mohammed V University, Rabat, Morocco, from 25 July – 1 August 1976.

The Congress was the first attempt to bring together professional mathematicians from all over Africa. There was extensive representation of most of the Anglophone and Francophone countries of north and west Africa, and smaller numbers from Botswana/Swaziland, Congo, Kenya, Uganda and Zaire. A small number of mathematicians were present by invitation from several countries outside Africa; Professor G R Allan (University of Leeds), Professor J E Phythian (Open University) and Mr B J Wilson (British Council) attended from Britain.

The work of the Congress centred round the twin themes of mathematical research and mathematics education. Current mathematical work in many African universities was reported, and problems shared and discussed. A significant long-term outcome of the Congress was the formation of the African Mathematics Union (UMA).

2. AFRICAN MATHEMATICS UNION (UMA)

This new organisation of professional African mathematicians and mathematics educators was established during the First Pan-African Congress of Mathematicians, held in Morocco in July 1976 (see above paragraph).

The Executive Committee of the UMA is:

President:	Dr Hogbe-Nlend (Cameroun)
Vice-Presidents:	Dr A Ashour (Egypt)
	Dr K Harzallah (Tunisia)
	Dr R O Ohuche (Nigeria)
	Dr G Saitoti (Kenya)
Secretary-General:	Dr I Khalil (Morocco)
Treasurer:	Dr S Toure (Ivory Coast)
Members:	Dr Alema (Ethiopia)
	Dr El Sawi (Sudan)
	Dr Mavinga (Zaire)
	Dr Owusu-Ansah (Ghana)
	Dr Sekou Traore (Congo)

The Second Pan-African Congress is to be held in Cameroun in 1980. Until then the Secretariat will be based in Morocco. The address of the Secretary-General is:

Professor I Khalil
Dean of the Faculty of Science,
Mohammed V University
BP 1014
Rabat, Morocco.

20. INTERNATIONAL COUNCIL OF ASSOCIATION FOR SCIENCE EDUCATION (ICASE)

Reference was made in SEN 29 (Section 22) to the General Assembly of ICASE held in Oxford in December 1975 and to the appointment of the new officers of the Association.

The present membership of ICASE is as follows:

AUSTRALIA	Australian Science Teachers' Association
BARBADOS	Barbados Association for Science Education
BELGIUM	Vereninging van Laraars in de Wetenschappen (Ve Le We) Association Belge de Professeurs de Physique et Chimie
CANADA	British Columbia Science Teachers' Association Science Teachers' Association of Manitoba Science Teachers' Association of Ontario
DENMARK	Foreningen af Fysik og Kemilaerere

GHANA	Ghana Association of Science Teachers
GUYANA	Guyana Science Teachers' Association
HONG KONG	Hong Kong Association for Science and Mathematics Education
INDIA	All India Science Teachers' Association
INDONESIA	Ikatan Pengajar Science dan Matematika (IPSM)
IRELAND	Irish Science Teachers' Association
ITALY	Associazione per l'Insegnamento della Fisica (AIF)
JAMAICA	The Association of Science Teachers' of Jamaica
KENYA	Kenya Science Teachers' Association
LESOTHO	The Lesotho Science and Mathematics Teachers' Association
MAURITIUS	Association for Science Education
NETHERLANDS	Nederlandse Vereniging voor het Onderwijs in de Natuurwetenschappen (NVON)
NIGERIA	Science Teachers' Association of Nigeria
PHILIPPINES	Philippines' Organic Chemistry Teachers' Association
ST VINCENT	St Vincent Association of Science Teachers
SIERRA LEONE	Sierra Leone Association of Science Teachers
SINGAPORE	Science Teachers' Association of Singapore
SWAZILAND	Swaziland Science Teachers' Association
TRINIDAD & TOBAGO	Association for Science Education of Trinidad and Tobago
UNITED KINGDOM	Association for Science Education Institute of Physics
USA	National Association for Research in Science Teaching National Science Teachers' Association Federation for Unified Science Education
ZAMBIA	Zambia Association for Science Education
CARIBBEAN REGION	Caribbean Region Organisation of Associations for Science Education (CROASE)
WEST AFRICAN REGION	West African Association of Science Teachers (WAAST)
COMMONWEALTH	Commonwealth Association of Science and Mathematics Educators (CASME)

21. THIRD INTERNATIONAL CONGRESS ON MATHEMATICAL EDUCATION (SEN 30:24)

The third in the four-yearly series of ICME Congresses took place at Karlsruhe, Federal Republic of Germany, from 16 to 21 August 1976. Previous Congresses had taken place at Lyon (France) in 1968, and at Exeter (Britain) in 1972 (SEN 20:24).

ICME is the major international gathering of mathematics educators, and it is difficult to summarise the work of a Congress with a world-wide membership of over 1700 participants. Extensive consideration was given to mathematics education at all levels, through the work of thirteen international panels. Before the Congress, the organising secretary of each panel had prepared, in consultation with his panel, a survey-report of a particular aspect of mathematics education on an international basis. During the Congress, these reports were reviewed and refined. The final versions will comprise the thirteen chapters of *'New Trends in Mathematics Education'*, Volume 4, to be published by UNESCO, probably in 1977.

In addition to the work of the main panels, there was a wealth of other activities – working-groups, displays, exhibitions, workshops, work with children, and 'poster-sessions' at which short papers were displayed with their authors present to discuss them with those interested. A working-group of particular interest to many readers of SEN was a continuation of that formed during the Exeter Congress, on *'Mathematics in Developing Countries'*. Only limited time was available, and the group concentrated on the specific problem posed by the rapidly-increasing enrolments in secondary schools in many developing countries, with the consequent need to diversify mathematics education at this level to cater for the wide range of ability now found among secondary students. Current experience was shared and discussed from a number of developing countries. Two projects which aroused particular interest in this connection were the Caribbean Mathematics Project (SEN 28:15, 30:14) and the

Mathematics Workcard Project in Botswana, Lesotho and Swaziland (SEN 29:17). It is hoped that major attention will be given to the special needs of the developing countries at the 4th ICME, in 1980.

22. 18TH LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT

This year's youth science fortnight, organised by the Council for International Contact, was held in London from 28 July to 11 August.

The fortnight's activities included a forum on alternative sources of energy and its conservation; visits to research and industrial establishments, university departments and science museums; seminars on such topics as arrow poisons and medicines, electronics and industry, and environmental conservation; and a variety of films and lectures.

The 19th London International Youth Science Fortnight will take place from 27 July to 10 August 1977. Details will be available from the Council for International Contact, 179-183 Fulham Palace Road, London W6 8QU.

23. COSTED

The Committee on Science & Technology in Developing Countries which is one of the Committees reporting to the International Council of Scientific Unions (ICSU) has recently issued the first of a series of Newsletters. It is published for COSTED by Asha, Indian Institute of Science, Bangalore 560012, India, which is also the Secretariat for COSTED. The first issue contains articles on the Satellite Instructional Television Experiment (SITE) in India and Science Education in India, an article written by Professor K Vasu of the Institute of Science, Bangalore.

24. ASIAN ASSOCIATION FOR BIOLOGY EDUCATION (AABE)

The sixth biennial conference of the Asian Association for Biology Education took place in Bangkok from 28 July to 2 August 1976. The theme of the meeting was *'Preparation of Teachers and Resources for Biology Teaching'*. Each day was devoted to different aspects of this theme, starting with a leading lecture, and including contributions from country representatives.

The topics were;

Challenges in the Structure and Method for the Preparation of Biology Teachers

How are the Teacher Curriculum and Strategies of Training made Relevant for Biology Teaching?

The Development and Utilization of Indigenous Resources for the Education of Biology Teachers

Teaching Resources for the Biology Teacher

The Biology Teacher: Role and Responsibilities

Associations and Regional Teacher Training Centres: How they make biology teaching more effective and relevant.

Further information is obtainable from:

Dr Twee Hormchong

Director AABE, IPST

PO Box 1425

Bangkok, Thailand.

25. COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME) AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1975/76

(see SEN 28:30)

Six entries for this competition were received, from Ghana, Hong Kong, Kenya and Malaysia. Judging has now been completed and the winners are as follows:

No first prize was awarded

Second — Mr Joseph Yakubu, Ghana. — 'The Influence of Culture on the Learning and Teaching of Science in Northern Ghana'

An introduction to the cultural background of the Kusasis followed by an account of how science concepts are embedded in the way of life of the Kusasi people. The writer concludes his account by showing how the Kusasi language could be developed as a tool for science teaching and underlines the philosophy that the use of materials and aids without due appreciation of the problems of culture is not enough, if a teacher is to promote good science education in his society.

Joint Third	Mr Mak Shui Keung, Hong Kong	'The Eighth Joint School Science Exhibition in Hong Kong'

This account, with attached documents and photographs includes notes on organisation, fund-raising and general publicity for a Science Exhibition.

Joint Third	Miss Jane W Muriithi, Kenya	'Nature, Life and History of an East African Rift Valley Lake – Lake Naivasha'

An account of a project carried out as part of a normal course requirement in a teacher training college. This detailed study is presented under three main headings: physiography of the area around Lake Naivasha, hydrology of the Lake Naivasha area, and the geology of the Lake and its surroundings.

Details and registration form for CASME awards 1976/77 are given in this issue, section 26.

26. COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME): AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1976/77

1. Introduction

The purpose of these awards is to encourage teachers in schools and colleges overseas in the development of their teaching of science and mathematics.

In recent years there has been an emphasis on social aspects of science and mathematics teaching and it is hoped that entries will continue to reflect this trend. Emphasis should also be given to the relevance of science and mathematics curricula to local needs and conditions and to the impact of technology and agriculture on the local community.

2. Countries involved

The following countries overseas have been involved in the scheme in recent years:

Associated States of the Eastern Caribbean
Barbados
Belize
Botswana
Cyprus
Ethiopia
Ghana
Guyana
Hong Kong
Jamaica
Kenya
Lesotho
Malawi
Malaysia
Malta
Nigeria
Sierra Leone
Singapore
Sudan
Swaziland
Tanzania
Trinidad & Tobago
Uganda.

The organisers would be happy to receive entries from other countries as well.

Full details are given below of the arrangements for the 1976/77 competition.

3. Topics for the Competition

Awards will be made on the basis of reports submitted to the Judges relating to the following aspects of science and mathematics education:

– the development of teaching materials aimed at introducing pupils to the broad field of the social impact of science and mathematics.

Aspects of science and mathematics education suggested as suitable for consideration are:

- the development of curricula and syllabuses
- the design and production of teaching materials to meet special needs
- investigation of the learning process in relation to study and teaching
- the planning, equipment, provision and use of laboratory facilities, including resourceful solutions to meeting needs in circumstances of limited facilities
- a science exhibition contribution
- language and the teaching of science and mathematics

These subject areas will remain as broad outlines within which new materials may be developed and under which entries may be submitted, but in each entry the relationship of the work to its social context and its impact on the nation, community or individual must be made clear.

It is intended that the topic of the entry should be based on personal experience and should include a substantial account of teaching and/or other education work actually carried out on the suggested lines.

In the last three years, award-winning entries have covered the following topics:

Integrated Science Education

Techniques for teaching selected topics in the lower primary science programme

Activities of a school science club

A detailed ecological study of a given area

How to teach Biology with a limited amount of laboratory equipment and space

Water pollution

Industrial education terminology

Concept of noise pollution

Description of a schools science exhibition

Motivation of children's interests in the learning of Magnetism

The influence of culture on the learning and teaching of science in an area.

4. **Awards**

Awards to the total value of £300 will be made according to the decision of the Judges. This sum will be generously provided by the Commonwealth Association of Science and Mathematics Educators. The right is reserved to refrain from awarding a first prize if the Judges advise that no candidate has submitted an entry worthy of the award. In the event of no first prize being awarded the prize money may be divided in whatever manner appears equable in the light of the Judges' recommendations. The decisions of the Judges will be final and no correspondence will be entered into concerning their decision.

5. **Categories of Entrants**

Entries are invited from teachers in primary, secondary or tertiary education institutions.

Entries may be submitted by either individuals or syndicates (eg the science staff of a school or college, or a partnership of teachers from more than one institution).

6. **Presentation of Entry**

Only one entry can be accepted from any one entrant or syndicate.

The entry must be written or typed on the side of quarto sheets of paper. Reports should not exceed 10,000 words in length and normally might be expected to be of the order of 2,000 – 5,000 words.

Photographs and other illustrative material should be included wherever relevant, together with any other evidence that shows the ideas have been effective in practice. Such evidence should include the work of pupils whenever possible.

Reference should be made to the source of information or of original experiments wherever this is necessary to a proper assessment of the proposed modifications. If any substantial part of an entry is being published or submitted as a thesis, this should be mentioned on the top sheet of the entry.

The Judges will pay more attention to evidence of original thought and ingenious application than to mere bulk. Moreover, as stated in paragraph 3 of the report should be based on personal experience, and work which has been actually tried out long enough to provide some evidence of its value.

7. **Dates**

Registration must be made before 1 December 1976.

Entries from officially registered candidates must arrive in the Science and Mathematics Education Unit of the British Council before 1 March 1977.

The awards will be announced in the summer of 1977.

8. **Treatment of the Selected Topics**

The Judges will be glad to consider any reasonable treatment of the selected topics provided it is based on personal, or team, experience and it includes a substantial account of teaching and/or education work actually carried out relevant to the topic. The CASME Awards scheme is intended to reward original teaching carried out for long enough to enable a reasonable assessment of it to be made. Entries which are only suggested schemes, new programmes, or revised syllabuses which have not been tried out will not be considered. Judges may return an entry for submission at a later date if it shows promise but has been submitted prematurely.

The following may be of help to intending entrants. While these may provide guidelines for the construction of an entry, it is not suggested that this is the only form of submission:

An account should be given of:

- the background to the work;
- the particular difficulties or problems which were to be solved, or other reasons for the work;
- the thinking (principle) on which action was based;
- what action was taken and how it was carried out;
- reactions and results;
- further action to be taken or rethinking.

Application for Registration must be made before the date given in paragraph 7 above.

Intending applicants should therefore apply early for registration forms to:

1. Your local British Council Office or
2. CASME Awards,
   c/o Science & Mathematics Education Unit,
   The British Council
   10 Spring Gardens
   London SW1A 2BN

9. **Please note that reports submitted must be the entrant's own original work, and should not have been published to date.**

REGISTRATION FORM

THE CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS (OVERSEAS)

Administered

a. locally by : Your local British Council Office

b. in London by : CASME Awards
c/o Science & Mathematics Education Unit
The British Council
10 Spring Gardens
London SW1A 2BN

PLEASE READ THIS CAREFULLY BEFORE COMPLETING THE FORM

A Registration Form must be completed and received by the above Administrator by **31 December 1976**

As acknowledgement of receipt of the Registration Form you will receive a 'Top Sheet' giving you a Registration Number. You must submit this Top Sheet with your entry and the number will be your identification. Please do not add your name and address as the number will identify you. Please also use this number in any correspondence.

If your address given beneath changes between completing this form and the notification of the Awards **please advise** the London address above.

In the case of a syndicate entry please list, on a separate paper, the names, qualifications, teacher experience and present position of all members.

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1. Name of entrant or syndicate nominee
(Block letters with Surname underlined) .....

2. Address for correspondence .....
.....
.....
.....
.....

3. Name of School or College .....

4. Brief title and outline of proposed entry .....
.....
.....
.....
.....
.....
.....

5. Qualifications, with dates
(eg degree, teachers certificate) .....

.....

6. Brief record of teaching service and present position .....

.....

.....

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.....

7. I have / have not * previously submitted an entry for the Guiness Awards or CASME Awards Scheme

If you have, please give details .....

8. This entry has / has not * been submitted for consideration in other competitions

If so, please give details .....

.....

* *Delete parts which are not applicable*

9. I certify that this entry is my (in the case of a syndicate entry, our) own original work, and that it has not been published to date.

Signed ..... Date .....

DISPOSAL OF ENTRY

A. If the entry receives an Award, first publication rights are thereby assigned to CASME.

Signed ..... Date .....

B. If the entry does not receive an Award, please return the entry to me/or CASME may retain the entry with first publication rights. *

Signed ..... Date .....

* *Delete part which is not applicable.*